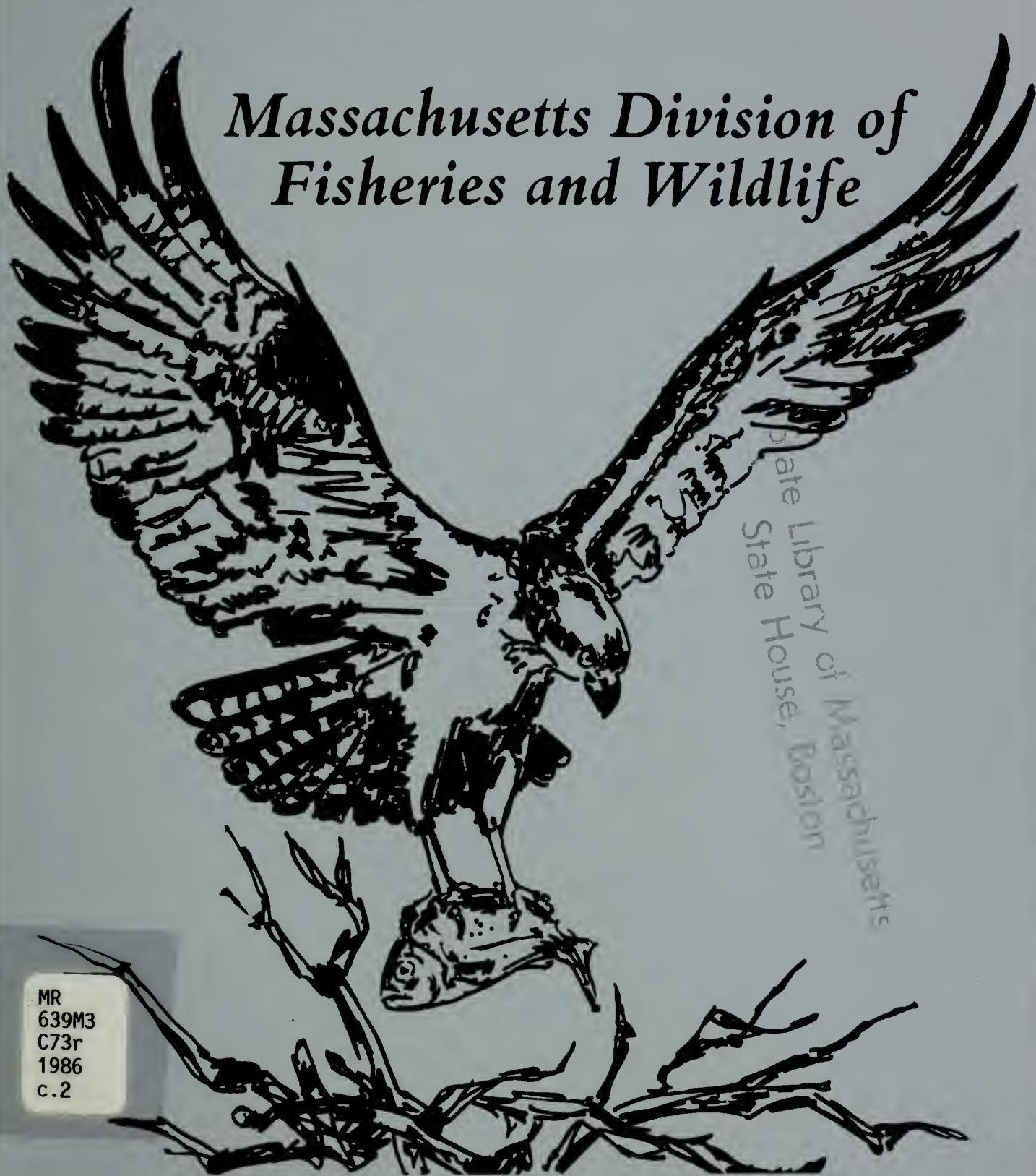




1986

# Annual Report

## *Massachusetts Division of Fisheries and Wildlife*



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DIRECTOR

His Excellency, Michael S. Dukakis, Governor of the Commonwealth, the Executive Council, the General Court, and the Board of the Division of Fisheries and Wildlife.

Sirs:

I have the honor to submit herewith the One Hundred and Twenty-First Annual Report of the Division of Fisheries and Wildlife, covering the fiscal year 1 July 1985 to 30 June 1986.

Respectfully submitted,

*Wayne F. MacCallum*  
Wayne F. MacCallum  
Acting Director

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# Highlights of 1986

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Nineteen eighty-six was marked by the advent of some significant new programs, the expansion of existing programs and authorization for certain key new programs.

New programs initiated during this year include a new forestry/wildlife program headed by John Scanlon, formerly a consulting forester for Bay State Forestry Service, and the establishment in Massachusetts of Project WILD, a classroom-oriented wildlife program suitable for Grades K-12.

Programs expanding are lead by the land acquisition program. During this year, the legislature and Governor approved a capital outlay of 11.5 billion dollars for land purchase. To meet this mandate, a realty staff member was added to each wildlife district. By the end of the reporting period, the staff had increased Division holdings by 1,156 acres. The salmon restoration program was enhanced by the opening of a fish passageway at Lowell on the Merrimack River and by the signing of a comprehensive plan for the management of anadromous fish species on the Merrimack. This plan calls for the development of five fish passages at five dams. The deer program hit a new

high in the 1985 season with hunters taking a total of 5,289 deer. Press coverage also set records as newspapers around the state responded to Division press releases, programs and events by printing an average of 374 news items each month or an estimated 12 items about the Division, Division programs, or Division personnel each day.

Looking ahead, the Division will move in some new directions. Land acquisition will increase as a result of the bond issue. In order to reduce Division expenses, approval was obtained to place Massachusetts Wildlife on a subscription basis. Following an initial outlay for Fiscal Year 1987, the magazine should become self-supporting. Another new program will see the Division moving into the wildlife art field as the Legislature has authorized the Division to prepare and sell prints made from the art of Louis Agassiz Fuertes which is housed in the Commonwealth archives.

The outlook for the Division's restoration programs is promising. One shorebird, the piping plover, was granted endangered status during this year and now enjoys the protection such listing entails.

During this year we note, with sadness, the passing of Herman Wiesner, who died on January 6, 1986 during the performance of his management and maintenance responsibilities.



# The Board Reports

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George Darey  
Chairman

The Massachusetts Fisheries and Wildlife Board is charged with the responsibility of establishing regulations for the perpetuation, utilization and conservation of wildlife throughout the Commonwealth. In addition, the Board provides oversight of the activities of the Division of Fisheries and Wildlife, authorizes its activities and endeavors to assist Division administrators in streamlining Division functions. The seven unpaid members of this Board address their responsibilities through monthly working meetings which are held in various locations around the state to facilitate public access to the Board and its activities. At these meetings, the Board solicits biological input from staff of the Division of Fisheries and Wildlife, considers public testimony on regulatory matters and examines a wide variety of materials relevant to the subjects under consideration.

During Fiscal 1986, the Board held 13 working meetings and seven (7) public hearings on regulatory matters. They also promoted six informational meetings relating to deer management (2), the Nongame program (3), and a proposal to introduce white amur to Massachusetts (1). In addition, they obtained in-depth briefings on numerous Division programs and they discussed and considered a wide variety of issues relevant to Division operations, wildlife-related requests and environmental issues in the Commonwealth.

Two issues high on the Board's list of priorities, held over from 1985, were to establish the Division's magazine, MASSACHUSETTS WILDLIFE, on a subscription basis in a move toward allowing the publication to become self-supporting and to improve forest management on Division-held properties and where possible, generate income from the sale of timber on such lands. Both of the goals were realized during this year.

In July 1985, the legislature authorized a one-time expenditure to permit the Division to revise the magazine and establish a subscription system. The first subscription issue was published a year later and sent to an initial 5,000 subscribers. Also during that month, wildlife forester John Scanlon joined the Division and began surveying wildlife management areas in the Western District and conducting inventory on those areas.

This was the year in which the Board first grappled with the issue of the federal mandate to utilize non-toxic shot for waterfowl. To make this transition feasible, the Board directed the Division to introduce legislation allowing larger shot sizes than those currently permitted. The Board also took a strong stand on the issue of the number of hunting days allowed Massachusetts waterfowlers. On three occasions, letters were sent to the U. S. Fish and Wildlife Service requesting extra days in lieu of days lost to the Commonwealth's "No Sunday Hunting" provision.

A major item for consideration during this year was the possibility of introducing the white amur or some hybrid from thereof to serve as a weed control agent in selected waters and specifically in Lake Chebacco, Essex. This item was discussed in depth during six of the thirteen working sessions. At the conclusion of the June discussion, the Board voted to continue to investigate the feasibility of using the white amur and to evaluate proposals on a pond-by-pond basis.

The Board also addressed the issue of PCB contamination of portions of the Housatonic River. The Board received copies of a report issued by General Electric detailing options for the cleanup of the contaminants. In reviewing these options, the Board expressed concern that certain ones would contain the contamination but would destroy important wildlife habitat and impact local fish and wildlife. The Division was specifically concerned as a major landowner along that section of river and generally concerned in its role as monitor of wildlife populations.

The proposed establishment of microwave towers adjacent to Hawley State Forest, as part of the Air Force's GWEN System, also posed a threat to key wildlife habitat. Members of the Board visited the area and considered alternatives prior to opposing the proposal.

Issues relating to operation of the Division involved concern with the existing salary scale, one of the lowest in the nation, and led to Board concern about the Division's ability to retain staff, especially upper management. Housing for Division staff became an issue when the state mandated that rates on housing located on state-owned properties be set at fair market rates. As this did not consider the oversight and emergency service responsibilities of employees currently in such housing, it appeared that the ruling might adversely affect security and safety at hatcheries and game farms. Vehicles came under Board scrutiny when the Department of Administration and Finance proposed to conduct all auction/sales of used state vehicles and deposit funds from such sales into the general fund. This was resolved and revenues from the sale of used Massachusetts Division of Fisheries and Wildlife vehicles will be deposited in the Inland Fish and Game Fund. Concern was raised over the possible need for an increase in license fees. This was averted by savings affected by placing the magazine on subscription, by a substantial saving in game farm operations, and by an increase in license sales during Fiscal Year 1985. An additional financial problem was averted when Division administrators arranged continuation of federal funding to this agency despite federal concerns over procedures in other agencies which, under the block funding methods currently in use, could have curtailed disbursement of federal funds.

Other concerns which occupied the Board's attention included an investigation into regulations of the Division of Forests and Parks as they might affect hunting or trapping along the Appalachian Trail and response to a complaint filed regarding a research project on diamond-backed terrapins.

At the Board's request, updatings were provided by Division staff on forestry and habitat improvement on wildlife management areas, on the Division's publicity program and four updatings were provided on the status and progress of MASSACHUSETTS WILDLIFE, a review of falconry regulations and a briefing on the history of the fee and the permit system for furbearer trapping.

#### Issues Presented at Public Hearings Were:

- (1) Waterfowl regulations and consideration of issues relative to non-toxic shot. This is an annual hearing to set season dates and regulations. Seasons were set.
- (2) A proposal relative to the hunting of coyotes and the sale of their pelts. The Board rejected the proposal to open coyote hunting during the shotgun deer season, retained existing regulations and requirements.
- (3) A proposal to extend the area open to turkey hunting.
- (4) A proposal to change regulations pertinent to deer hunting in Ipswich and Essex. (Accepted)



- (5) A proposal to permit the trapping of coyotes, two hearings (at the request of the Massachusetts Trappers Association).  
(Rejected)
- (6) A proposal relative to the use of Conibear traps, two hearings (at the request of the Massachusetts Trappers Association).  
(Proposal referred to study)
- (7) A proposal to change regulations pertaining to the harvesting of beaver and muskrat, two hearings (at the request of the Massachusetts Trappers Association). (Rejected)
- (8) A proposal to revise and clarify regulations pertaining to the possession and maintenance of wild animals. Two hearings held on this issue. (Accepted)
- (9) A proposal to establish additional catch-and-release fishing areas in the Commonwealth, two hearings.

Accepted: Portions of the East Branch of the Westfield River, the Deerfield River, the Swift River and the entirety of the Quashnet River.

Rejected: The Quinepoxet River

Tabled: The Mashpee River and Higgins Pond

- (10) A proposal to regulate fishing tournaments, two hearings. (Tabled)
- (11) A proposal to close Whetstone Brook to fishing, two hearings. Fish populations have declined dramatically in Whetstone Brook over the past 20 years; a change which may be attributable in part to acidification. Over a five-year period, the Division will conduct a study to determine the effects of an experimental technology in mitigation of the effects of acid conditions in streams.  
(Accepted)

#### Other Actions Taken by the Board Included:

A vote to oppose establishment of microwave towers in Hawley.

Selection of format and frequency for the new MASSACHUSETTS WILDLIFE.

Acceptance of a proposal to initiate a fawn mortality study through the Cooperative Wildlife Research Unit.

Issuance of a letter of reprimand to the project leader of a study on diamond-backed terrapins.

A vote to oppose any legislation establishing a dove season.

A vote to authorize the Director to close the Connecticut River to Atlantic salmon fishing for a 90-day period.

## FISHERIES AND WILDLIFE BOARD MEMBERS

George Darey, Chairman

Nancy Begin

Colton H. Bridges

Ray Whitaker

Jack Creedon

Laurence Fountain

Gwilym Jones





# Fisheries

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Peter H. Oatis  
Assistant Director of Fisheries

## Acid Rain Investigations

The Acid Rain Monitoring Project conducted through the Massachusetts Water Resources Research Center at the University of Massachusetts successfully completed Phase II, the initial screening of the entire state for pH, alkalinity and heavy metal analysis. This effort, when combined with the first phase, utilizes over 2,700 sampling sites across the state and provides a strong basis for the design of Phase III which will entail monitoring of approximately 800 sites on a quarterly basis for the next ten years. The data gathered to date clearly indicate that a significant portion of our inland aquatic resources are threatened by continuing acidification. About seventeen percent of our water bodies are now classified as critical or acidified (alkalinity values less than 2ppm), forty percent are endangered (alkalinity values are below 10ppm), and have very little capacity to buffer additional acid load.

An aquatic research review committee was established for the purpose of soliciting and reviewing research proposals designed to investigate the impacts of acidification on aquatic resources. Requests for proposals went out through a variety of publications and 13 proposals were submitted and reviewed. Of these, three were accepted for funding. They include a study designed to explain the mechanism for mercury methylation which is greatly accelerated in acid waters and causes increased amounts of mercury in fish. Other studies include one to better define the pathways by which aluminum enters acid waters. Another offers funding for water chemistry analyses on the impact of acidification on salamander populations in vernal ponds.

The fisheries section completed and presented a paper entitled "A Preliminary Economic Assessment of Liming Lakes in Massachusetts" at the Northeast Fish and Wildlife Conference in Hershey, Pennsylvania. The section also funded and assisted the Massachusetts Audubon Society with the second year effort of assessing the impacts of liming Cape Cod kettle ponds. The project also funded and assisted Dr. Paul Kostecki of the University of Massachusetts in two projects, the first dealing with determining potential impact of acidification and heavy metal increases on the reproduction of rainbow smelt. The second was an investigation of the possibility of devising an indicator of stress in fish populations subjected to increasing levels of acidification.

A major effort aimed at evaluating mitigative techniques applicable to stream environments was initiated with the U. S. Fish and Wildlife Service. The Massachusetts Division of Fisheries and Wildlife applied for and received a National Acid Precipitation Program grant in excess of \$500,000 that will enable us to determine the costs and advantages of dosing flowing waters with lime on a demand basis. After an extensive screening process, acid-impacted Whetstone Brook in the Wendell State Forest was selected as the study area. The study is designed to run over a five-year period with the first few years being used to accurately assess base-line information and the next three years for determining the effects of liming on the stream biota. Gauging stations have been installed by the U. S. Geological Survey, detailed maps of the study area have been prepared and the water chemistry analytical laboratory has passed all quality control and assurance standards. Extensive preliminary biological investigations were initiated and a project leader, Dr. Kenneth Simmons, was hired through the Cooperative Fisheries Unit at the University.

We also completed an Environmental Impact Report for a generic liming permit and signed an agreement with Living Lakes, Inc., a non-profit group, as a means of defraying the costs of liming several acidic lakes. Through this agreement, six acidic Cape Cod kettle ponds were limed. Follow-up investigations relative to the impact and assessment of benefits of the liming are being evaluated by the contractor at no cost to the Division

or the Commonwealth. Some additional lakes will be treated with lime during fiscal year 1988.

The threat of increasing acidification of our inland waters is very real and will likely place increasing demand on fisheries staff resources. The mitigative strategies being developed are an effort to maintain the existing fisheries and represent a stopgap measure that will hopefully buy time until actual causes of acidification can be addressed.

#### Fisheries Development

The bulk of the effort in this project was spent with Trout Unlimited volunteers working under the direction of staff biologists. Members of the Southeast Chapter of Trout Unlimited cut willows in the Quashnet River Sections Three and Four, removed sand barriers in Section Five and constructed a one hundred-foot spawning channel in Section Four. Pioneer Valley Chapter members completed Operation Restore commitments by filling, loam-topping and planting grass on the last stream deflector in the catch-and-release area of the Swift River.

Planning and land clearing for anticipated improvements at the Sunderland Trout Hatchery progressed on schedule as did the production of 3,700 Northern pike and 4,700 tiger muskie at the Reed State Fish Hatchery. The successful netting of 40 mature walleye from Assawompsett Pond in Lakeville gave some indication that the Division may soon have a supply of fish from which to develop fishable populations of walleye in a few selected waters of the Commonwealth.

#### Anadromous Fish Investigations

##### Connecticut River

Fish passage at the Holyoke Dam was very successful this year due to low water and early installation of the flashboards across the dam. A total of 481,668 shad, 632,225 blueback herring, 40,308 lamprey, 369 striped bass and 285 Atlantic salmon were passed through the facility. Approximately 6,298 shad were transported from Holyoke to other river basins throughout the Northeast.

Fish passage at Turners Falls was better than in previous years but there is still a major impediment to upstream migration between the Cabot Station and the spillway and gatehouse fishways. Shad passage at Cabot was 31,000 and the spillway fishway was 843; however, passage through the gatehouse, and hence access to up-river areas, was only 3,855 shad (12%). Observations at the log sluice spillway indicate that at least half of the shad passed at Cabot Station did return to the lower river. Shad angling data were not tabulated this year, but a new world record of 11 pounds, 4 ounces was set by Robert Thibodo of Northampton.



During the fall, 32,800 salmon parrreared at the Reed Hatchery were marked with coded wire tags. These fish were released into the Millers and Deerfield Rivers as smolts during the spring of 1986. Subsequent salmon rearing activity at Reed Hatchery will be focused on the production of adult salmon females for the purpose of increasing egg and fry supplies. These juveniles will be planted throughout the basin in coldwater streams for the purpose of increasing the number and quality of Connecticut River smolts. The salmon smolt production potential within the Massachusetts portion of the basin is currently being assessed through the efforts of the Massachusetts Cooperative Fisheries Research Unit. Initial investigations are in progress along the Bear and South Rivers within the Deerfield drainage.

### Merrimack River

Although hampered by mechanical difficulties at Essex Dam, the 13,086 shad passed represent a 138% increase in passage. Doubtless the low water conditions and early installation of the flashboards contributed significantly to the increased efficiency of the shad lift operation. A total of 23,112 herring were also passed along with 18,403 lamprey, 110 striped bass and 212 Atlantic salmon. Based upon interviews with 169 anglers fishing below the Essex Dam, we estimate the fishery supported 2,239 angler trips (7516 hours) and a catch of 4,633 shad. Approximately 81% of the shad caught were released. A few salmon were known to be caught and released, but none were reported by the anglers that were interviewed.

The fishway at Pawtucket Dam in Lowell is nearing completion and should be ready for the 1987 spring run. Unfortunately, there has been vandalism on the recently completed spillway ladder.

Considerable efforts are also being expended to forestall problems to the salmon program that may occur if a license is issued to develop hydropower at Sewalls Falls, New Hampshire. Discussions with Public Service Company of New Hampshire were also initiated to develop a schedule for the construction of upstream fish passage facilities at their five facilities which pose barriers to upstream passage along the main stem of the river.

### Fisheries Survey and Inventory

Observation of 21 tributaries to the Quabbin Reservoir for evidence of smelt reproduction indicated that egg deposition was light with the exception of a 400 foot section of Underhill Brook. Low water levels in the reservoir (down 8 feet) preclude access to spawning habitat in many of the streams. Although only trace amounts of young-of-the-year smelt appeared on the Nash Hill screens later during the summer, the condition of both lake trout and landlocked salmon did not reflect any significant loss of forage base. At Quabbin, the creel agent interviewed 6,836 boat anglers during the season. Overall, angling activity in terms of trips was down 12%, fishing pressure in terms of hours was down 20% and the total harvest was down 31% in numbers and 14% by weight when compared to the previous year. This drop is attributed to extremely poor spring weather and to the fact that the reservoir water level was down about eight feet. This was the third consecutive spring that the

reservoir was stocked with salmon smolts. Early indications are that the salmon are growing very well and numerous sub-legal (15-17 inch) fish are being caught and released. Creel data reveal that a significant amount of angling pressure formerly directed at lake trout has been redirected to salmon. The changed increase in the minimum legal length of salmon to 18 inches will be monitored for the next few years to see if the new regulation has in fact improved the quality of salmon fishing in the reservoir. Smallmouth bass fishing declined in about the same proportion as the pressure; however, the average weight of the fish appearing in the harvest increased by 16%. Subsequent scale reading will reveal whether this increase in the size of fish is due to anglers being more selective or there was poorer survival in some of the year classes that are just entering the fishery.

District crews and staff biologists conducted biological surveys of 23 lakes and 64 streams during the year. Information is being tabulated and computer programs are being developed for the rapid assimilation and analysis of all lake and stream inventory data. When compiled, the data will greatly facilitate future fisheries planning and environmental impact assessment investigations. The results of 573 angler questionnaires from around the state are also being tabulated and analyzed. The social and economic information gleaned from this exercise will also be used in the development of future fisheries regulations and management practices.

Poor hatchery survival of sea-run brown trout young continue to hamper the program in reaching its goal of 6% adult return from a release of 25,000 smolts. Although summer sampling in the streams indicates that post stocking survival is at least 8% for sub-adults, poor returns of adults indicate that additional effort must be expended to determine what the limiting factors are to adult survival in the estuary.

#### Technical Assistance

An increasing amount of staff time is being allocated to the Toxics in Fish Program. This program is a cooperative effort between this Division, the Division of Water Pollution Control and the Department of Public Health. The purpose is to collect and analyze fish from areas suspected to be contaminated with toxic substances that may be assimilated by fish and thus, become a public health hazard. This year's efforts focused primarily on the Ten Mile and Sudbury Rivers. Realization of the problem in these rivers has prompted this Division to initiate broader investigations relative to determining the impacts of toxic substances upon the aquatic wildlife resources.

A wide variety of environmental impact reports were reviewed and commented upon as were numerous project permit applications. Much progress is being made with respect to computerizing the resource data presently on file at Field Headquarters. Because of their familiarity with data base programs, fisheries staff have also assisted staff members from other sections of the

Division in establishing files for license sales, equipment inventories and federal aid accounting processes.

#### Aquatic Resource Education

The Wallop-Breaux amendment to the Sportfishing Restoration Act now permits the expenditure of up to 10% of the federal matching money allocated to each state by the Act for the purpose of educating the public about aquatic issues. In April of 1986, the section completed the application for funds that will support an aquatic education program. Present plans call for the state supported Urban Angler Program and the aquatic segment of Project WILD to be funded by this Wallop-Breaux fund. This will place the programs on a more solid financial basis and allow production of numerous other aquatic educational materials. Because the program makes extensive use of volunteer services that can serve as the state's share of the program costs, the program will be funded essentially 100% by federal dollars. Future educational materials to be produced by the program include a book describing the distribution of freshwater fish throughout the Commonwealth and a series of four color posters depicting the freshwater fish of the state. These posters will be distributed to all middle schools in the state.



# Fish Hatcheries

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David Fredenburgh  
Chief Fish Culturist

During fiscal year 1986, the Division's hatcheries produced 967,494 fish weighing 513,936 pounds. Of that number, 627,171 measured 9 inches or more. A detailed breakdown of production is included in the accompanying table.

Most of the operations were routine and involved normal fish production and maintenance at five fish hatcheries.

One unusual project was the beginning of a rejuvenation for the Sunderland Hatchery. A sum of thirty thousand dollars was allocated to construct an 18" x 24" gravel-packed well for the hatchery designed to produce 500 gallons per minute. It is hoped that the cost of construction will be met through a bond issue rather than trying to fund the project out of the existing development account.

The McLaughlin Hatchery continued with the yearly maintenance program of turbine pump replacement. This has allowed the hatchery to operate with minimal pumping problems.

A new six-inch well was installed at East Sandwich primarily to supply water to the hatchhouse in the event of a failure in the main well. The new well is designed to produce 100 gallons per minute.

At both Montague and Sunderland Hatcheries, wire grids were installed over selected sections of ponds and raceways to discourage birds, particularly great blue herons, from taking fish. These net grids are presently being evaluated for effectiveness. In general, it was a good production year with the sizes and quality of fish being above normal.

PRODUCTION FIGURES 1985 - 86

|                     | 5½"    | 6-9"    | 9+"     | 12+"    | Tot. Fish | Weight  |
|---------------------|--------|---------|---------|---------|-----------|---------|
| <u>McLaughlin</u>   |        |         |         |         |           |         |
| Rainbow             | -      | -       | 35,000  | 166,905 | 201,905   | 200,225 |
| Brook               | -      | 46,475  | 98,423  | -       | 144,898   | 55,103  |
| Brown               | -      | 136,671 | -       | -       | 136,671   | 25,887  |
| Quabbin Rainbow     | 65,235 | -       | -       | -       | 65,235    | 3,051   |
| Total               | 65,235 | 183,146 | 133,423 | 166,905 | 548,709   | 284,266 |
| <u>Palmer</u>       |        |         |         |         |           |         |
| Rainbow             | -      | -       | 2,528   | -       | 2,528     | 1,586   |
| Northern Pike       | -      | -       | 3,400   | -       | 3,400     | 690     |
| Tiger Muskie        | -      | 9,878   | -       | -       | 9,878     | 746     |
| Land. Salmon        | -      | -       | 32,500  | -       | 32,500    | 6,842   |
| Total               | -      | 9,878   | 38,428  | -       | 48,306    | 9,864   |
| <u>Montague</u>     |        |         |         |         |           |         |
| Rainbow             | -      | -       | 45,400  | 37,850  | 83,250    | -       |
| Brown               | -      | -       | -       | 12,290  | 12,290    | -       |
| Total               | -      | -       | 45,400  | 50,140  | 95,540    | 76,936  |
| <u>Sunderland</u>   |        |         |         |         |           |         |
| Rainbow             | -      | -       | 56,659  | -       | 56,659    | 44,641  |
| Brook               | -      | -       | 15,110  | -       | 15,110    | 14,790  |
| Brown               | -      | 5,000   | 21,001  | -       | 26,001    | 21,286  |
| Total               | -      | 5,000   | 92,770  | -       | 97,770    | 80,717  |
| <u>Sandwich</u>     |        |         |         |         |           |         |
| Rainbow             | -      | -       | 39,100  | -       | 39,100    | 23,176  |
| Brook               | -      | 13,800  | 36,375  | -       | 50,175    | 18,263  |
| Brown               | -      | 36,789  | 24,630  | -       | 61,419    | 19,433  |
| Cohos               | -      | 24,942  | -       | -       | 24,942    | 1,217   |
| Cohos Sea-run       | -      | 1,533   | -       | -       | 1,533     | 64      |
| Total               | -      | 77,064  | 100,105 | -       | 177,169   | 62,153  |
| <b>Grand Totals</b> | 65,235 | 275,088 | 410,126 | 217,045 | 967,494   | 513,936 |

## PLANNING

After many years of effort, the Division's long range plan was completed and published in January of 1985. Federal funding for the planning process was curtailed in April 30, 1985. These factors, coupled with the resignation on July 1, 1985 of Kristine Corey who had headed the Division's planning office, combined to halt formal planning activities for the time being. During this fiscal year there was no activity in the planning program.





# Wildlife

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Wayne F. MacCallum  
Assistant Director of Wildlife

The Wildlife Research Section is responsible for the management of the approximately 75 species of birds, mammals, reptiles and amphibians which are traditionally hunted or trapped. Principal activities of the section include monitoring of population levels and annual harvest, development of recommendations concerning regulations and policy relative to the Commonwealth's wildlife resources, planning and implementation of habitat management programs, development of Division-funded University of Massachusetts Cooperative Wildlife Research Unit studies, technical assistance to other agencies and private citizens experiencing problems caused by wildlife, development and implementation of wildlife research programs qualifying for federal grants. Summaries of current programs follow.



## WATERFOWL

### Pre-Season Banding

A total of 1,363 marsh birds were banded during the 1985 pre-season period; 559 wood ducks, 444 mallards, 118 black ducks, 18 mallard black duck hybrids, 78 blue-winged teal, 124 green-winged teal, 5 common moorhens, 12 soras and 1 Virginia rail. The majority (1,294) of birds were captured by airboat nightlighting. Other ducks were banded by bait trapping or nest box trapping.

### Mid-Winter Waterfowl Survey

A total of 111,540 waterfowl were counted on the 1986 mid-winter survey, down 55% from last year, due primarily to a drop in the number of eider ducks observed. Black duck numbers, 21,820, were near average while numbers of mallards, canvasbacks and Canada geese were up substantially.

### Winter Banding

The winter of 1985-86 was generally mild and afforded poor banding conditions. This was the third such winter in the past four years. Only 177 black ducks were banded along with 59 hybrids, 22 mallards, and 8 pintails. Hybrids comprised 23% of the mallards and black ducks banded with the highest rate again in the Plymouth-Duxbury area where the hybrid rate was 36%.

### Canada Goose Study

No insert included.

### Wood Duck Nest Structure Study

Five wood ducks used plastic buckets on 15 new study areas while six wood ducks and two hooded mergansers nested in wooden boxes. Box usage on 15 established wood duck production areas was 41% for 46 buckets and 59% for 169 boxes. The nesting success rate was 63% in buckets and 91% in boxes.

### Wood Duck Production Study

There were 216 wood duck and 12 hooded merganser nest starts in 548 available structures on 50 wood duck production areas across the state. There were 189 successful wood duck hatches and 10 merganser hatches. The increased population appears to be a reflection of reduced harvests associated with season opening dates of October 20 or later.

### Experimental Waterfowl Season Appraisal

After two years of zoning with the state divided into three zones, the waterfowl harvests was 2.6% below the average harvest experienced when the state was divided into only two zones and 29% below the pre-zoning average. Major declines were recorded in harvest of black ducks and wood ducks due, in large part, to harvest restrictions aimed at protection of black ducks.



Massachusetts achieved a 27% black duck harvest reduction in 1983 followed by a 30.4% reduction in 1984. A complete analysis of 1985 waterfowl harvest returns is not available at this time, but it appears that Massachusetts will easily exceed the federal requirement of a 25% reduction in black duck harvest over the three-year period.

#### Woodcock

The bag limit on woodcock was increased from two in 1984 to three birds in 1985 due to an increasing breeding bird index and an anticipated good breeding season due to favorable weather conditions.

Hunter success in 1985 increased with 1.8 birds bagged per day as compared to 1.4 in 1984. The seasonal bag also increased from 6.6 in 1984 to 9.1 in 1985.

Production (brood survival) in 1985 remained good with 2.7 immatures reported for each adult hen.

The 1986 spring singing-ground census showed an increase of 29%, up from 1.50 to 1.94 birds counted per survey route. Singing-ground counts are still below the long-term average, but have continued to improve since 1982 when a spring snowstorm severely affected the breeding woodcock population.

#### Mourning Dove Census

Due to manpower limitations and the limited usefulness of dove survey information, the number of dove survey routes in Massachusetts was decreased from 18 in 1985 to eight in 1986. The number of calling doves on three long-term routes increased 67% from 1985 to 1986. Counts on eight comparable routes increased 9% (101 to 110 doves) from 1985 to 1986.

#### Bobwhite Quail Census

The 1985 weighted call index for Plymouth County showed a significant increase over the 1983 index. The 1985 weighted index for Bristol County showed a significant decrease over a five-year (1975-83) mean index. Indices for all other counties and the statewide total showed no significant change when comparing 1985 indices to 1983, to the five-year mean (all routes) and to the five-year mean (comparable routes only).

#### White-Tailed Deer

Following a review of 1985 activities, an informal long range planning effort was initiated. This effort identified the following goals:

- (1) Develop a conceptual management model that incorporates habitat, humans and deer.
- (2) Establish data bases that document habitat, humans, and deer trend data for the state.
- (3) Develop a deer population model that reconstructs deer population dynamics for the past 15 years.
- (4) Develop carrying capacity guidelines for each deer management zone that include both human and habitat factors.
- (5) Identify research needs to supplement model development.

Substantial progress was made toward each goal in 1986. The management model uses a systems approach that recognizes three components (habitat, humans, and deer), the interrelationships among these components, and the dynamics associated with the components. Data bases were established for each component. Future work will include automating these data bases in order to improve analysis efforts. A working deer population model was developed using a computer spreadsheet. This model appears adequate to describe population dynamics associated with past population trends. The model is still in a development stage but is operational at present. Carrying capacity estimates have been established and are being analyzed. Changes in these estimates may follow future research efforts. Research was initiated to improve understanding of fawn mortality, winter weather severity, deer herd condition, and population dynamics.

During the regular 1986 deer seasons, 5,610 deer were harvested by hunters. This is the highest harvest on record. Archers harvested about 10% of the deer during a three-week season. Shotgun hunters took 81% of the deer during a nine-day season in December. Approximately 9% of the harvest occurred in the three-day primitive firearm season. The female harvest rate is such that it will allow continued growth in herd productivity and in the deer population. Antlerless permits were allocated based on relative herd size and carrying capacity determinations for each management zone. Although management goals will allow overall growth in the state's herd, steps were taken to reduce or stabilize growth in those zones where human population density is high and/or deer hunters approach carrying capacity.

Future management efforts will be directed towards meeting established goals and continuing on-going research. Goals and progress will be reviewed each year in order to refine research efforts.

#### Furbearer

A total of 23 fur buyers submitted annual reports; six did not buy any furs from Massachusetts trappers or hunters. The remaining 17 purchased 22,476

muskrat, 556 mink, 52 otter, 5,339 raccoon, 764 red fox, 8 skunk, 103 gray fox, 509 beaver, 79 opossum, 10 bobcat, 84 fisher and 12 coyote.

The results of four fur auctions held by the Bay State Trappers Association were weighted and tabulated to give a yearly average. The average prices for 1985-86 were muskrat \$3.21, mink \$17.45, otter \$25.60, raccoon \$12.81, red fox \$22.68, gray fox \$22.84, beaver \$23.15, opossum \$1.05, bobcat \$37.80, fisher \$102.32 and coyote \$21.60.

### Falconry

During 1986, there were 34 licensed falconers in Massachusetts--10 apprentice, 16 general and 8 masters. Six breeding permits were issued and 27 raptor salvage permits. Raptor rehabilitators treated 343 birds of which 141 were released back to the wild.

### Wildlife/Forestry Program

The first of three objectives for the wildlife/forestry program is to build an inventory data base for each wildlife management area (WMA) held by the Division of Fisheries and Wildlife. To date, this has been achieved on three areas and part of a fourth, totalling 4,000 acres (the 420-acre Savoy WMA, the 2,000-acre Hy Fox WMA, the 1,200-Fox Den WMA, and 400 acres of the 2,800-acre Peru WMA). The second objective of the program is to use the inventory data to design and carry out commercial forest cutting operations that improve wildlife habitat by providing a variety of forest age classes (0-10, 10-25, and 25+ year classes) interspersed with herbaceous openings.

The first such commercial operation has been initiated on the Hy Fox WMA in the towns of Chester and Worthington. A contract for the commercial sale of 350,000 board feet of timber and 700 cords of firewood was awarded to Gagnon Brothers Logging Company of Goshen, Massachusetts after a competitive bid procedure which attracted bids from six logging companies. The contract requires the establishment of herbaceous openings of 2-5 acres, in what was formerly extensive mature forest, relatively heavy cutting in mature hardwood stands of poor commercial value (to regenerate early successional stage forest and improve long-term commercial value), and selective cutting in mature pine and mix hardwood forest (to enhance growth of co-dominant trees and to provide regeneration of desirable species such as red oak). Revenue from the sale are being used for the construction of access roads, installation of locking gates (to reduce R.V. damage to roads), and preparation of herbaceous openings.

The third objective of the wildlife/forestry program is to determine the response of wildlife populations to management. Breeding song birds were chosen for census because they can be sampled accurately and relatively easily by sound, and the variety of bird species occurring on an area over time reflects changes in habitat quality. A breeding bird census was conducted on 1,000 acres of the Hy Fox WMA prior to cutting from May 31 to June 10, 1986 (85 species found), and the census will be repeated annually in cut and uncut areas each spring for the next three to five years.



The forestry program continues to benefit from interaction with the Massachusetts Cooperative Wildlife Research Unit and the University of Massachusetts Department of Forestry and Wildlife by hiring senior level and graduate students for inventory work (through the efforts of Wendell Dodge of the Cooperative Unit), and by using a computerized inventory data program (courtesy of Jow Mawson of the Department of Forestry and Wildlife).

Work planned for the immediate future includes forest inventory on the Peru, Becket, and Chalet WMAs, a second commercial sale on the Hy Fox WMA, and a commercial sale on the Fox Den WMA.

#### Wild Turkey Range and Harvest Evaluation

The seventh Massachusetts spring gobbler hunt was held in May 1986, with the three-week season (as in 1985) consisting of a one-week first segment (May 5-10) and a two-week second segment (May 12-24). The open hunting zone was expanded and included the following areas: Berkshire and Franklin counties, those portions of Hampden and Hampshire counties west of the west bank of the Connecticut River, and that portion of Worcester County west of state Route 31 and north of state Route 9. Hunters were allowed to apply for and hunt during only one segment of the season, but could hunt anywhere in the open zone. A total of 6,750 permits were allocated for each segment of which 3,873 were issued for the first period and 3,045 for the second period. A record number of turkeys--444--were taken; 329 the first period and 115 in the second period. Hunters had an overall participation rate of 89.1% and an overall success rate of 7.2%. The Berkshire County kill was 282 (63.5%) with Franklin (66) second and Worcester (36) third. Adult males comprised 270 (61%) of the take.

Although winter trapping was again hindered by the lack of snow, Division staff and Massachusetts Cooperative Wildlife Research Unit personnel succeeded in capturing 25 turkeys for translocation. Nineteen birds (8 adult female, 5 immature female and 6 immature male) were released on Rocky Gutter WMA, Middleboro, and five (immature male) were released on Bolton Flats WMA, Bolton. One immature male was injured and was not released.

#### Statewide Beaver Harvest

The 1985-86 beaver trapping season ran from November 15 to February 28 statewide as in 1984-85. Conibear traps larger than size No. 110 or the equivalent were not allowed after January 15. During this season, a total of 1,044 beaver were taken by 90 trappers in 105 towns, with a mean take of 11.6 beaver per successful trapper. This take represents a decrease of eight beaver (0.8%) from 1984-85. Harvests increased by more than 20% in Berkshire, Franklin, and Middlesex counties and in the western region. Decreases of more than 20% occurred in Hampshire and Worcester counties and in the eastern region. For the third consecutive year, harvests in the eastern region exceeded those in the western region.

## Statewide Otter and Fisher Investigations

During the 1985 otter season, 55 successful trappers took 98 otter in 60 towns in eight counties for a mean take of 1.8 otter per successful trapper. This compares with a harvest of 142 and a mean take of 2.1 in 1984.

The fisher take increased from 140 in 1984 to 152 (the second highest take recorded) in 1985, with 55 successful trappers taking an average of 2.8 fisher each among 47 towns in eight counties. In 1984, 58 successful trappers took an average of 2.4 fisher each.

Worcester (35), Essex (14), Berkshire (13), and Franklin (12) counties and Zones 03 (29), and 02 (22) yielded the most otter, while Worcester (99), Franklin (27), and Middlesex (13) produced the most fisher.

A total of 98 otter carcasses and 151 fisher carcasses were received from cooperating trappers. The mean age of otter in 1985 was 2.21 and of fisher 1.39. This compares with 2.17 for otter and 1.55 for fisher in 1984. Eleven of 14 otter aged 2.5 and older and 14 of 18 fisher aged 1.5 and older showed evidence of reproductive activity. Average corpora lutea counts were 2.4 for otter and 2.9 for fisher in 1985, as compared to 2.5 and 3.0 respectively in 1984.

## Bobcat Harvest Evaluation

A total of 23 bobcats were taken in 1985-86, including 16 by hunting, six by trapping, and one depredation kill. The mean take per successful hunter (N=14) was 1.1 (range: 1-2) and per successful trapper (N=2) was 3.0 (range: 1-5). All trapped bobcats were taken in November, while February (7, 44%) was the most successful month for hunting. During the 1985-86 season, bobcats were taken in 15 towns in six counties. Juveniles (0.5 age class) comprised 45% (9) of the sample (20).

## Coyote Investigations and Harvest Study

A total of 31 coyotes were taken by 25 sportsmen in 23 towns and six counties during the 1985-86 hunting season. The majority (13, 42%) were taken in November with the same number and percentage targeting specifically for coyote. Six other mortalities, including four road kills, one illegal kill, and one accidentally-trapped animal were recorded during the 1985-86 report period.

## Black Bear Reproductive Success and Cub Survival in Massachusetts

Six adult females that were potential cub producers were followed intensively on foot from early September through denning, as in previous years, to construct a profile of major fall food sources for each female.

Dens of these six females were visited during the first week of February 1986 and cubs were counted, sexed, tagged, and weighed. Only three cubs were



born in two litters to six females, due primarily to the shortage of mast crops in some areas during the fall of 1985. In late March, one cub was collared and was subsequently followed intensively through May, when it slipped its collar.

Data analyses are complete and the final report is being prepared.

#### Black Bear Distribution and Harvest Investigations

A total of 921 bear hunting permits were issued for the 1985 hunting season. A total of 14 bear were taken during the two-week split season, including 13 during the first segment and one during the second segment. Five males and nine females were taken in Berkshire (5), Franklin (4), Hampshire (3), and Hampden (2) counties. Two non-hunting mortalities, both road kills, were recorded. Only one nuisance bear report was received.

#### Cooperative Unit Studies

##### Harvest Surveys and Analyses

A random sample of 1984 hunting license purchasers from each Massachusetts county was surveyed by mail questionnaires in March. Of 1,247 sampled individuals, 439 (35.20%) returned questionnaires. An additional 355 non-respondents were contacted and interviewed by telephone in April resulting in 794 (63.67%) total contacts. Statewide game harvest estimates were tabulated for various small game species.

An estimated 74,764 ( $SE = 2,082$ ) individuals hunted in Massachusetts during the 1985-86 hunting season. Total hunting license sales and percentages of individuals who purchased licenses in 1984 and hunted in Massachusetts during the 1985-86 season were tabulated.

White-tailed deer was the most sought game animal with approximately 62,150 ( $SE = 2,067$ ) hunters seeking them. Pheasant was the most sought small game species with an estimated 42,487 ( $SE = 1,995$ ) hunters seeking. Remaining game and furbearer species and estimated harvests will be compared with results from a second survey to be conducted in 1987.

#### Mortality of White-tailed Deer Fawns in Western Massachusetts

Ordering of equipment and materials delayed field work and hence the capture of adult does. Fifteen bait sites were established in southern Berkshire County in mid-February. Deer usage of bait sites was very good. However, due to lack of suitable snow cover and an early spring, deer usage of bait sites became very sporadic in March, making immobilization attempts unsuccessful.

Clover traps were installed in late March. Because of absence of snow cover, deer had alternate foods and would not enter traps for bait. Trapping and immobilization were discontinued on May 4.



One doe was immobilized and collared in March and monitored through parturition. Despite intensive ground searches her two fawns could not be located until they were 8-10 days old, and would avoid searchers. These two fawns are currently being monitored through activities of the dam.

During April and the first two weeks of May, spotlight census and surveys of areas were conducted to identify probable fawning sites. Ground searches were conducted from May 20 through June 12. Six fawns were captured and fitted with radio collars. These fawns will be monitored through fall 1986.

Summer trapping of adult females will be attempted in late June-July using salt as bait in clover traps. Winter baiting and trapping will begin in mid-December.

#### Wild Turkey Population Dynamics

Birds instrumented during the last reporting period were monitored through December 1985. Hens with broods were intensively monitored to determine poult survival and brood habitat use. Vegetation at brood locations was measured in order to characterize preferred habitat. Trapping operations were conducted January - February to recapture instrumented or banded birds. A final report is in preparation.

#### Statewide Development (W-9-D)

The following jobs were performed on wildlife management areas throughout the state during Fiscal 1986:

|   |              |
|---|--------------|
| Building Maintenance                          | 15 buildings |
| Dam Maintenance                               | 5 dams       |
| Bridge Maintenance                            | 6 bridges    |
| Road and Trail Maintenance                    | 103 miles    |
| Parking Lot Constructed                       | 1 lot        |
| Parking Lots Maintained                       | 86 lots      |
| Maintenance of Blinds                         | 15 blinds    |
| Posting Boundaries                            | 132.1 miles  |
| Posting Signs                                 | 2296 signs   |
| Planting Trees and Shrubs                     | 2100 plants  |
| Maintenance of Fields                         | 342 acres    |
| Administering Cooperative Farm Agreements     | 808 acres    |
| Clearing                                      | one acre     |
| Brushcutting and Herbiciding                  | 300 acres    |
| Timber Management (selective cutting)         | 13 acres     |
| Wood Duck Nest Box Construction - Maintenance | 1155 boxes   |
| Water Level Management                        | 163 acres    |
| Permit Hunting                                | 4 areas      |
| Gate Construction and Maintenance             | 63 gates     |

Additional time was spent in project planning, managing public hunts, inspecting areas and in repairing and maintaining project equipment.

### Game Farms

Routine maintenance of buildings, grounds and rearing pens were conducted at both Sandwich and Ayer Game Farms. A total of four new bulk feed bins were installed at both farms. Ten large rearing pens were constructed at Ayer Game Farm increasing its rearing capacity to 30,000. The Sandwich Game Farm constructed a new water well.

Both farms continue a strict sanitary program in order to maintain disease free premises. In addition, the Sandwich Game Farm inoculated all brood stock against fowl cholera.

The following game birds were released as part of general distribution:

|          | <u>Pheasant</u> | <u>Quail</u> |
|----------|-----------------|--------------|
| Ayer     | 34,679          |              |
| Sandwich | <u>13,460</u>   | <u>4,470</u> |
| Total    | 48,139*         | 4,470**      |

\* Includes 4,416 birds under the Sportsmen's Rearing Program

\*\* Includes 270 field trial birds



## Nongame and Endangered Species

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Bradford G. Blodget  
State Ornithologist

In the Nongame and Endangered Species Program's second year of funding through a voluntary state income tax check-off, the earnings were \$261,475, representing a 20% decline over the previous year.

On January 28, 1986, the Division and the U. S. Fish and Wildlife Service consummated a Limited Authority Plant Agreement for endangered and threatened plants found in Massachusetts. This agreement significantly expands and broadens the Division's responsibilities in this important area and augments our present agreement that dates from 1979 covering endangered and threatened wildlife.

Fiscal Year 1986 was a year of significant progress in the Nongame and Endangered Species Program and the affiliated Natural Heritage Program. Highlights of the year are as follows.

### Peregrine Falcon Restoration

Six young peregrine falcons were received from the Peregrine Fund of Ithaca, New York for release from the John McCormack Post Office and Federal Court House Building in downtown Boston. These young falcons were placed in a "hack box" located on the building's roof on June 7, 1985 and were released on June 16. Immediately after release, a sub-adult peregrine appeared at the site and began harassing the young birds as they made their first flights.

This harassment lasted eight days and resulted indirectly in the loss of two young falcons. One bird was chased until it was killed by striking a building and a second bird was chased so far from the release site that it was apparently not able to find its way back. After the harassment ceased the older falcon became a positive influence on the younger birds which performed behaviors, such as hunting, at least two weeks sooner than the falcons that were released in 1984.

On June 29, the sub-adult falcon came to the hack box to feed and was identified as "Dublin" (yellow band #141), a male falcon released at the site in 1984. He returned to the hack box at least nine times, feeding four times on food left out for the younger falcons.

On July 23, one of the young falcons was picked up at Logan Airport in a weak condition. The wildlife clinic at the Tufts School of Veterinary Medicine diagnosed the problem as trichomoniasis, caused by a common bird parasite. After treatment, this bird regained its strength and was re-released on August 22. On July 30, another of the young falcons was killed after flying into a large glass window at the Prudential Building.

### Bald Eagle Restoration

The number of young eagles released at Quabbin Reservoir was increased to eight this year. After being collected from wild nests on Cape Breton, Nova Scotia, the eight young eagles were flown to Massachusetts on June 21, 1985. All eight were released in good health on August 9. The eagles were monitored through the fall with five of the birds known to be at the reservoir through mid-December. Winter observations revealed two of the young eagles wintering at Quabbin.

On August 9, 1985, a 1984-released eagle that had been found shot at Quabbin, was re-released along with the newly hatched birds. This eagle had been found injured in March 1985 and had undergone prolonged treatment at the Tufts University wildlife clinic.

On September 4, 1985, an eagle originally released at Quabbin in 1983 was found at the Toronto Reservoir, New York, suffering from mercury poisoning; it later died.



Eight new birds were received from Nova Scotia on June 20, 1986 for release in Fiscal year 1987.

### Eagle Wintering Survey

The 1986 winter eagle survey was held on January 10, 1986. A total of 54 bald eagles (28 adults and 26 immature) were counted from seven localities around the state. Forty-two of these birds (23 adults and 19 immatures) were seen at Quabbin Reservoir. One golden eagle was also observed at Quabbin.

### Plymouth Red-bellied Turtle

A contract to conduct research on the natural history and limiting factors of this endangered turtle was continued with Dr. Terry Graham of Worcester State College.

During the spring of 1985, searches of nesting beaches revealed 24 clutches containing 325 eggs. From these nests, 107 viable hatchlings were produced and 50 of these were kept for headstarting by the New England Aquarium, Berkshire Museum, and Terry Graham. The remaining 57 were released directly into the wild. Thirty-one of the 50 headstarted turtles survived and will be released in July 1986. The 19 mortalities were due primarily to nutritional and lighting deficiencies. A meeting of all the cooperators was held on July 18, 1986 to address these problems and resulted in the development of a headstarting protocol. This document will insure that in the future, each cooperator will provide the necessary husbandry for the headstarted hatchlings.

### Piping Plover

The East Coast piping plover population was listed by the U. S. Fish and Wildlife Service ("the Service") as "threatened" on January 10, 1986. In expectation of this event, the program began collecting field reports in 1984 to establish the plover's status in Massachusetts. With improved inventory coverage, in 1986, 139 breeding pairs were tallied from 51 sites. All but nine pairs occurred south of Boston and 70 pairs (50%) occurred at sites on Cape Cod. The number of pairs at sites varied from one to 13. Productivity varied greatly from site to site. Threats to the birds reported from the various sites included disturbance and direct mortality of eggs and young from recreational beach users, off-road vehicles, dogs, foxes and gulls.

Some piping plover nests are protected incidental to the protection of tern colonies. Among the most notable management actions in 1986 was the U. S. Fish and Wildlife Services' closure of approximately three miles of outer beach on Plum Island within the Parker River National Wildlife Refuge expressly for the protection of piping plovers and least terns. Copies of a piping plover informational brochure developed by the U. S. Fish and Wildlife Service and reprinted by the Division of Fisheries and Wildlife are now available for distribution.



## Tern Inventory and Management

The annual tern census, coordinated by the State Ornithologist, Bradford G. Blodget, yielded 11,719 breeding pairs in the state. This included 7,643 pairs of common terns at 20 sites (up 1% from 1985), 2,306 pairs of least terns at 42 sites (down 1% from 1985), 1,746 pairs of roseate terns at four sites (up 8% from 1985), and 24 pairs of Arctic terns at four sites (compared to 16 pairs at four sites in the two previous years). The annual survey of tern colonies in Massachusetts is probably the most thorough and long standing such survey in the Northeast. It would not be possible without the combined efforts of several other conservation organizations and numerous individual cooperators.

## Short-eared Owl

The first year of a three year study of the population ecology, habitat use, and management needs of the Short-eared Owl in Massachusetts was completed in Fiscal year 1986. Twenty to 25 resident pairs were estimated for the state, including eight to 11 pairs on Nantucket, five to six pairs on Monomoy National Wildlife Refuge, four pairs on Tuckernuck Island, one pair on Martha's Vineyard, one to two pairs on Muskeget Island, and one pair at Pocket Marsh on Cape Cod. This study was undertaken by Denver Holt under the direction of Zoologist Scott Melvin.

## Rare Grassland Birds

Camp Edwards/Otis Air National Guard Base provides critical habitat for three species of rare grassland birds in Massachusetts: the upland sandpiper (State Endangered), the Northern harrier (State Threatened), and the grasshopper sparrow (Species of Special Concern). A study directed by Program Zoologist Scott Melvin began in 1985 to develop a management plan for the conservation of these grassland birds. Fourteen pairs of upland sandpipers, one pair of Northern harriers, and at least 22 pairs of grasshopper sparrows were present during the breeding season at this site. Upland sandpipers presently nest at only seven locations in Massachusetts and Camp Edwards/Otis Air National Guard Base supports the largest population.

## Osprey

Encouragement and restoration efforts of the state's osprey population made great strides in Fiscal Year 1986, setting many new records. A total of 116 occupied nests were reported, up 13% from 103 reported a year earlier. One hundred four nests were active (produced eggs), versus 88 in Fiscal Year 1985, for an 18% gain. Seventy-nine nests fledged young, up 20% from 66 a year earlier. A total of 166 young fledged in Fiscal Year 1986, up 14% from the previous year's results. The spectacular success of this program is demonstrated by comparison of this year's results with those a decade earlier when 45 young fledged from 17 nests.

Steady growth in the total population has been achieved as a result of lowered levels of toxicants such as DDT in the environment, the placement of artificial nest poles in suitable habitat by the Division and cooperators, and favorable weather during the breeding season. The most active cooperators continue to be Felix Neck Wildlife Sanctuary at Martha's Vineyard and Mr. and Mrs. Gilbert Fernandez at the Westport River.

During Fiscal Year 1986, seven new nest poles were installed by the program, bringing to 31 the total number installed since the project's inception in 1981. Installations were made at Pamet River, Truro; Grand Cove, Dennis; Washburn Island, Falmouth; Flat Pond, Mashpee; Onset Bay and Widow's Cove, Wareham; and Great Island, Yarmouth.

### Common Loon

In 1986, the Nongame and Endangered Species Program, Metropolitan District Commission, and the Massachusetts Audubon Society again received a joint grant from the North American Loon Fund. This grant helped fund a loon warden to monitor loons at Quabbin Reservoir. Five pairs of loons nested at Quabbin including, for the first time since the project's inception, one pair that nested on one of the six nesting rafts. Three chicks fledged, including one hatched aboard the raft.

Away from Quabbin Reservoir, a pair of loons nested at Wachusett Reservoir, raising two chicks.

### Rare Plants and Natural Communities

Many new records of rare plants and unusual natural communities were added to the computerized data base. Some of the more important plants included the second state occurrence of oysterleaf (Mertensia maritima), St. Andrews cross (Hypericum stragulum), papillose nut-rush (Scleria pauciflora var. caroliniana), boreal wormwood (Artemisia campestris), and golden-seal (Hydrastis canadensis); the first current state occurrence of small burr-reed (Sparganium minimum); the third occurrence of two-flowered rush (Juncus biflorus); the largest state populations of pygmy weed (Crassula aquatica) and purple needlegrass (Aristida purpurascens); and the discovery in the state of lake quillwort (Isoetes macrospora), last seen in 1967, and water sedge (Carex aquatilis), last seen in 1930. Botanist Bruce Sorrie and Heritage Coordinator Henry Woolsey authored a paper entitled, "Distribution of Atlantic White Cedar in Massachusetts" which appeared in the proceedings of a symposium on this restricted species.

### Environmental Review

A total of 1,151 projects were reviewed by the program of which 137 required written comments because of the presence of rare plants, rare animals, or exemplary natural communities.

### Small Contracts

In an effort to stimulate more research on rare and endangered species, and natural communities, a Small Contracts Program was initiated. This program was designed to provide \$100 to \$2,000 for small, but high priority research topics. These contracts should be particularly helpful to student researchers. Of the thirty-six proposals received, 19 were selected for funding, totalling \$11,265.

### NONGAME ADVISORY COMMITTEE MEMBERS

Kathleen S. Anderson

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Karsten E. Hartel

Gwilym S. Jones

Richard T. Kleber

Dr. James McCarthy

C. Barre Hellquist

Christopher Leahy



## District Reports

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Northeast District, Walter L. Hoyt, District Wildlife Manager  
Southeast District, Louis Hambly, District Wildlife Manager  
Central District, Chris Thurlow, District Wildlife Manager  
Connecticut Valley District, Herman Covey, District Wildlife Manager  
Western District, Tom Keefe, District Wildlife Manager

The five wildlife districts form the field presence of the Division of Fisheries and Wildlife administering wildlife lands and dealing with wildlife issues throughout the Commonwealth.

Staff from the districts conduct fisheries and wildlife research projects under the direction of research biologists, conduct stocking programs, operate check stations, and serve as liaison with sporting and conservation groups in their areas. During the year, all Districts distributed licenses, abstracts and other material related to hunting/fishing license sales and they assisted officers from the Division of Environmental Law Enforcement in ensuring public adherence to wildlife laws and regulations.

Personnel from all districts staffed deer checking stations, and checked furbearer pelts, while staff from the Western and Connecticut Valley Districts also operated bear and turkey checking stations.

During the past year, District staff participated in a variety of on-going research programs; the mid-winter eagle survey, banding black ducks, waterfowl



inventory flights, inventory of mourning doves, woodcock, quail (Southeast), and bats (Western), survey of great blue heron rookeries and monitoring the pH levels of ponds and streams prior to fish stocking. Special projects brought staff from the Western Wildlife District out to assist researchers from the University of Massachusetts Cooperative Research Unit in the early stages of a study of fawn mortality and brought staff from the Connecticut Valley Wildlife District into the field to assist Project Leader Steve Henry with the Salmon Restoration Project. Central District staff conducted research on landlocked salmon at Wachusett Reservoir and on landlocked alewives at South Pond and at Singletary Lake. Members of the Southeast District continued a walleye pike program at Assawompsett Pond in Lakeville. Forty-four adult walleyes were captured and tagged. Fertilized eggs from the captured fish were hatched in a tank using Assawompsett Pond water. The successful hatching reassured biologists that the fish are capable of reproducing and that the water quality is adequate.

In addition to these duties, District staff members conducted statewide stocking programs releasing Eastern brook trout, brown trout, rainbow trout, Northern pike, and tiger muskies into ponds, lakes and rivers. Central District also released 13,000 landlocked salmon fry into tributaries of the Wachusett Reservoir. Districts also released pheasants, quail and snowshoe hare in appropriate upland areas and delivered pheasants to sportsmen's clubs participating in the club pheasant rearing program.

The majority of the time not spent in research or stocking activities was spent in maintaining and improving the Division's 40 wildlife management areas. Here District crews cut brush, seeded open areas, pruned and released fruit and nut trees. They also maintained roads, trails, and parking areas, posted signs, marked boundaries and repaired gates. Crews from the Southeast District cut brush and trees along the dikes of the Rochester rearing system to make the area more accessible to anglers. This District was hard hit by Hurricane Gloria and thus, had to apply special effort to clearing roadways of limbs and fallen trees and re-opening the streams of the Hockomock Wildlife Management Area. They also had to contend with vandalism at the fishing pier on Cook's Pond. While repairing the damage, they noted that the main beams of the pier are beginning to rot and need to be replaced. Staff of the Central District focussed special attention on the Birch Hill Wildlife Management Area where they installed access gates, brush cut fields and where the U. S. Army Corps of Engineers graded roads, and constructed a foot bridge.

Cooperative farming agreements were drawn up for wildlife management areas where appropriate.

Although District personnel had long been involved in the land acquisition program, this year saw a special effort in this area and found District staffers more involved than ever before in the process of identifying lands for possible purchase. The program was further expanded during this year by the addition to each District staff of one Realty Specialist responsible for conducting an aggressive program of land acquisition within the District.

As usual, the staff of all five districts were involved in many forms of technical review. They were called upon to review the Environmental Monitor for projects having an impact on wildlife. They provided data on wildlife and critical wildlife habitat and offered comments and guidance as needed. They investigated fish kill reports, advised callers on nuisance animal control and offered technical guidance to such groups as the U. S. Army Corps of Engineers, local selectmen, the U. S. Fish and Wildlife Service, legislators and private citizens. District crews were called upon to rescue a deer from a quarry, a loon from a wastewater treatment plant and they also investigated complaints about Canada geese, bear, beaver, deer, coyote and turkey.

Crews from the Western, Central, and Southeast Districts assisted in the turkey translocation program through which birds were captured in the western part of the state and moved to central and eastern areas. During February, six males and thirteen females were released in the Rocky Gutter Wildlife Management Area in Middleboro. Since that time, numerous turkey sightings have been reported including some sightings of hens with poults indicating that the translocation has been successful.

Central District crews assisted with renovation of the eagle hacking tower while staff of the Connecticut Valley District provided food for the eagles. Central District staff built and placed 20 bluebird boxes on wildlife management areas and erected a sign for the bluebird trail on the High Ridge Wildlife Management Area. A crew from the Connecticut Valley District assisted Sunderland Fish Hatchery personnel in constructing an exclosure system of poles strung with wire and nylon cord to keep out great blue herons which had been preying on the trout confined in the hatchery pools.

Charged with the oversight and maintenance of good public relations within their area, District managers attended meetings of the local county leagues of sportsmen's clubs, spoke with a wide variety of groups, and offered films and programs on Division programs as possible. In addition, the District manager, or his designee, attended public meetings, made press contacts, responded to public inquiries and staffed fairs and shows.



# Information and Education

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Ellie Horwitz  
Chief  
Information and Education

## Media Contacts

The Division continued its program of active communications with the media and received increasing amounts of positive press coverage. As press release figures are maintained on a calendar year basis, 1985 figures have been used for purposes of this report. In all, 32 press packets were issued containing 151 press releases. These were enthusiastically received by the press which responded to Division programs and concerns by presenting an average of 374 features per month which dealt with Division activities.

Eight special events brought members of the press to watch young eagles arriving for rearing and being released to the wild, a red-tailed hawk foster-parenting two orphaned young hawks, Division personnel taking part in a research program on black bear, the inauguration of the state's first bluebird trail, and the release of wild turkeys in eastern Massachusetts.

This continued the marked upward trend in press coverage of wildlife issues which has been evident during the past nine years.



## Exhibits and Programs

Hundreds of thousands of people became aware of the Division and its programs through visits to the Division's display at the Eastern States Exposition, the New England Fishing Exposition, the Springfield Sportsmen's Show, large local fairs such as the annual Greenfield and Topsfield Fairs, and many smaller exhibits aimed particularly at individuals interested in wildlife and conservation. As usual, Division staff prepared an extensive live animal display which was made even more attractive by the addition of a new mural painted by graphics assistant Cindy Slocum. At this time, the large display was renewed and replacement of several large components, including the pool, was initiated.

Many other people learned of Division programs through Division film presentations and slide programs offered at sportsman's clubs, civic clubs, garden clubs and other conservation-minded groups by Division staff members. Perhaps the most active in this area was Division photographer Jack Swedberg who reported 56 programs presented to a wide variety of groups.

## Education

Perhaps the most significant step taken during this year was initiation of the Division's participation in Project WILD, an interdisciplinary wildlife program which offers activities for teachers of grades K-12. This program is designed to stimulate an interest in and an awareness of wildlife which can, in turn, lead both teachers and students to develop a sense of responsibility for human actions which affect wildlife. In August of 1985, representatives of this section met with staff of the Massachusetts Audubon Society to form a cooperative partnership that will bring the program to Massachusetts. Shortly thereafter, two workshops were held to train an initial group of 20 teachers and 13 facilitators who will, in turn, train teachers. At first the program was controversial with certain animal rights groups protesting loudly and writing to school superintendents to ask them to block the use of this program. Despite this, the program held three more workshops and issued two copies of a WILD newsletter.

The Massachusetts Junior Conservation Camp, in operation since 1952, held another very successful session teaching the basics of fisheries and wildlife management and the rudiments of outdoor sports to a full contingent of campers during the designated two-week session. As usual, the camp, which was administered by the Division, featured sessions on fisheries and wildlife management taught by section staff members.

## Nongame Fund Promotion

This year there was a shift in management of the Nongame promotional effort. Initially, Nongame Information Specialist Joy Merzer prepared special film footage for use in television spots and prepared a wetlands exhibit for

the Boston Flower Show. In mid-year, Merzer left the program and was replaced by Marketing Specialist Dwight Galler. Galler came to the agency with a strong marketing background and initiated some tight promotional planning. Although some first attempts to obtain information on donors from the Department of Revenue and to include fund brochures with revenue mailings failed, other new initiatives such as developing a donor profile and inauguration of a miniseries on endangered species on WNEV-TV, were notably successful. Dwight arranged to have the Nongame Fund message carried on milk cartons and on three billboards. Eagle Snacks promoted the Fund at four events at the Worcester Centrum.

### Tags 'n' Trout

Tags 'n' Trout continued to grow with 18 participating groups, and the Sportfishing Awards Program set a participation record with 780 pins issued to anglers who took notable fish in 20 categories, 174 of them American shad. As a result, the weight limit for shad was raised from 6 pounds to 7 pounds. Volunteer intern David Riegle prepared an analysis of returns from the program to date. New check stations were added and the program's logo was redesigned to give it a more modern look.

### Visibility

In 1985 a modest effort was initiated to improve the Division's appearance both in-house and at exhibits and to increase staff familiarity with other programs within the Division so that they could serve as well-informed spokesmen. With this as a goal, name signs were provided for offices in Westboro, name badges were issued to most field staff, and blazers were provided to all personnel working on exhibits.

To increase staff familiarity with programs, the section again organized an employees conference which focussed on new programs and new achievements within the Division.

### Publications

Only two publications were added to the list this year as texts were prepared for a flyer on bluebirds and another on bluegills.

The Waterfowl Stamp Program, which has drawn considerable public interest over the past 12 years underwent a thorough review this year. Recommendations for revisions in procedures were sent to the Director and a strong recommendation was made to increase the price of the stamps.

### Information and Education Planning

Looking ahead, Section Chief Ellie Horwitz began to investigate a program of preparing and marketing a limited set of prints of paintings by

Louis Agassiz Fuertes. The original artwork for these prints appeared in 1927 in Birds of Massachusetts and Other New England States. Originals of these paintings had been located in the Massachusetts archives and restored with a grant from the Massachusetts Audubon Society. Very late in the year, the legislature passed a bill permitting the Massachusetts Division of Fisheries and Wildlife to prepare and sell an edition of prints with all proceeds to be divided between the Inland Fish and Wildlife Fund and the Nongame Fund.

# Realty



Floyd Richardson  
Chief of Wildlife Lands

A special allotment, earmarked for acquisition of open space, provided the "adrenaline" for an increased effort on behalf of the Realty Program this year. It stimulated acquisition of 1,156 acres of newly public land and permitted the staff to expand its horizons to the benefit of wildlife and the public.

Under this allotment, stipulated in Chapter 723 of the Acts of 1983 MGL, land acquisition was sanctioned in a number of categories.

This narrative identifies the acquisitions completed during Fiscal Year 1986, the type of property purchased in each instance, the purpose of said property, and the category of the capital outlay budget which made this particular acquisition possible.



Hinsdale Flats Wildlife Management Area1,296.20 Acres

Seventy-six and one-half acres of woodlands, brushlands, abandoned pasture-land and marshland made this acquisition an important addition to the existing wildlife management area. The land slopes gently from east to west providing ideal habitat for all species of wildlife indigenous to the region. The western boundary of this subject parcel is the East Branch of the Housatonic River. This latest purchase provides protection for the river from encroachment, beginning at the Washington/Hinsdale town line to Bullards Crossroads.

Fox Den Wildlife Management Area846 Acres

A parcel of woodland adjacent to the existing area, this property, which looks over the Middle Branch of the Westfield River in the Town of Worthington, consists of 98 acres. Hardwood and softwood species blend to provide food and cover for wildlife while serving as erosion agents on this sloping site. The additional river frontage is a plus for this increasingly popular management area.

Peru Wildlife Management Area3,365 Acres

The Peru Wildlife Management Area has been in existence for several years having come into this agency during the 1950s. The area has increased in size as opportunities to purchase presented themselves and acquisition funds were available. This area has provided sportsmen with diverse hunting opportunities and with fishing thrown in for good measure.

Two acquisitions this year improved the area by adding valuable road frontage which provides both additional access and off-road parking. These parcels contribute varied wildlife habitat and simultaneously prevent residential development from eroding a well-known wildlife area. These two acquisitions extend from Peru into Windsor and the combined acreage totals 363.5 additional acres.

Elbow Meadow Wildlife Management Area13 Acres

The strategy formulated to provide protection for this great blue heron rookery was first initiated during the previous fiscal year, 1985. This Division continued its efforts to acquire, in fee, adjacent lands to permanently protect the rookery. An additional eight acres was acquired in June and the deed to the property recorded. Subsequently, the Dunstable Conservation Commission obtained an easement in perpetuity on seven adjacent acres further protecting this fragile environment.

High Ridge Wildlife Management Area1,955.7 Acres

The acquisition of an additional 160 acres swells this management area to 1,955.7 acres. This newly acquired parcel adds a significant amount of

forested land and creates an important connecting corridor to a state forest. Recent woodlot cutting practices have opened the overstory on this forested area allowing the sun to penetrate to the forest floor. This removal of the overstory encourages new sprout growth and plant life furnishing food for many species of wildlife.

Bolton Flats Wildlife Management Area

922.9 Acres

The transfer of 182 acres in the Town of Lancaster from the Division of Capital Planning and Operations to this agency was a most significant acquisition. This parcel previously separated existing Fish and Wildlife lands making control and management of the area difficult.

The transferred parcel extends from Route 110 to the Nashua River. It is level and extremely fertile. A small segment is utilized by the community through a community gardening program.

The Division of Fisheries and Wildlife is extremely grateful to the Division of Capital Planning and Operations for their consideration and efforts in the transfer of this highly valuable agricultural and wildlife property.

Housatonic River Valley Wildlife Management Area

816.9 Acres

A five-acre parcel adjacent to this wildlife management area in the Town of Lenox was conveyed to the Division by the General Electric Corporation in exchange for an easement. This acquisition serves a two-fold purpose providing additional wildlife lands adjacent to the Housatonic River, and adding to the river corridor that extends from Pittsfield to Lee.

Housatonic River Access Area

17 Acres

Two parcels in the Town of Great Barrington were purchased using Major River Capital Outlay Funds. These parcels contain 17 acres and contribute extensive road and river frontage, allowing easy access to the river for canoeing enthusiasts. The frontage provided along Brookside Road and East River Road by these parcels provide much needed off-road parking.

For canoeing enthusiasts, an exciting adventure awaits those who launch their canoes at this site and glide noiselessly downstream. The typically New England farmland scenery unfolds around each bend tempting the camera buff as will the sightings of the several species of wildlife which frequent this region. The encounters with wildlife one can expect include herons, song birds, turtles, mink, muskrat and deer.

Richmond Marshland

23 Acres

The Town of Richmond, Berkshire County, hugs the New York state line. It is rural and extremely scenic, with rolling farmlands, apple orchards, forested hills and cool, clear brooks. This town also is noted for having the largest cattail marsh in Berkshire County. By accepting this gift, the Division and the public became the beneficiaries of 23 acres of this cattail marsh through the generosity of the Lon Nordeen Estate.

Phillipston Wildlife Management Area

3515.5 Acres

This wildlife area lies in three towns--Phillipston, Petersham and Hubbardston--offering excellent hunting, cross-country skiing, hiking and other recreational opportunities.

The addition of 143 acres in Petersham is certainly a bonus, adding significantly to the area with its forested lands and one-half mile of frontage on the East Branch of the Swift River. The river frontage adds a new dimension by providing fishing opportunities.

Mashpee Pine Barrens

65.1 Acres

The Mashpee site is the last remaining significant, unprotected pine barrens in Massachusetts. The Town of Mashpee has acquired adjoining lands providing a corridor which connects the newly-acquired wildlife lands with lands under the stewardship of the Wampanoag Tribal Council.

These pine barrens are a favorite nesting site for the whippoorwill; it is also home for the rare and endangered buck moth and the broom crowberry. This area is important as a water recharge area as the soils are predominantly sandy.

The Rare, Threatened, and Endangered Species Habitat Outlay Fund made this acquisition possible.

Podunk Marsh Acquisition Project

15 Acres

This 15-acre parcel was donated to the Division by Richard Hildreth. The property is located in the Town of East Brookfield, west of Route 49. This particular marsh serves as a buffer to an existing great blue heron rookery.



## Personnel Actions

Twenty-nine personnel changes were undertaken during this fiscal year.  
They are:

### Appointments

| <u>Name</u> | <u>Job Title</u>                        | <u>Date</u> |
|-------------|---|-------------|
| H. Wadach   | Skilled Conservation Helper             | 01/21/86    |
| P. MacAdams | Typist I - Part Time, Westboro          | 06/02/86    |
| M. Plourde  | Bookkeeper II, Boston                   | 06/02/86    |
| J. Santos   | Typist II, Boston                       | 06/08/86    |
| R. Perham   | Assistant Fish Culturist, Sandwich      | 06/15/86    |
| A. Leach    | Skilled Conservation Helper, McLaughlin | 09/28/86    |
| K. Carter   | Typist I, Westboro                      | 10/19/86    |
| M. Hartleb  | Typist I, Westboro                      | 10/12/86    |
| F. Ibili    | Bookkeeper, I, Boston                   | 12/28/86    |
| B. Brockman | Skilled Conservation Helper, Southeast  | 11/16/86    |
| R. Surette  | Bookkeeper I, Boston                    | 05/04/86    |



Retirements

| <u>Name</u> | <u>Job Title</u>                        | <u>Date</u> |
|-------------|---|-------------|
| M. Oakley   | Assistant Fish Culturist, Sandwich      | 02/02/86    |
| W. Dauderis | Assistant Game Culturist, Ayer          | 07/11/86    |
| E. LaBonte  | Skilled Conservation Helper, McLaughlin | 09/28/86    |

Deaths

|            |  |          |
|------------|--|----------|
| H. Wiesner | Skilled Conservation Helper, Southeast | 01/06/86 |
| E. Lech    | Conservation Helper, McLaughlin        | 04/16/86 |

Promotions

|            |  |          |
|------------|--|----------|
| R. Norton  | Skilled Conservation Helper, Southeast | 03/30/86 |
| S. Shea    | Assistant Game Culturist, Boston       | 08/10/86 |
| S. Henry   | Senior Land Use Planner, Westboro      | 09/29/86 |
| H. Kreiser | Skilled Conservation Helper, Northeast | 12/30/86 |
| G. Zima    | Information Officer I, Westboro        | 09/27/86 |

Resignations

|             |   |          |
|-------------|---|----------|
| K. Miller   | Senior Bookkeeper, Boston                 | 04/15/86 |
| M. LaFleur  | Typist I, Westboro                        | 07/11/86 |
| E. Cocaine  | Typist I, Westboro                        | 07/11/86 |
| M. Marengi  | Senior Bookkeeper, Boston                 | 08/15/86 |
| D. Bielecki | Skilled Conservation Helper, Conn. Valley | 08/23/86 |
| J. Hazzard  | Skilled Conservation Helper, Central      | 12/31/86 |

Transfer

|             |                             |          |
|-------------|-----------------------------|----------|
| I. Howard   | To D.E.M.                   | 01/05/86 |
| J. Sheppard | Public Access Board, Boston |          |

# Legislation

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## Chapter

|     |              |   |
|-----|--------------|---|
| 131 | Acts of 1986 | Exempting veterinarians from civil liability as a result of rendering emergency care to non-domestic animals. |
| 157 | Acts of 1986 | Relative to malicious killing or poisoning of animals.  |
| 159 | Acts of 1986 | Prohibiting the counterfeiting of tags and seals issued by the Division of Fisheries and Wildlife.            |
| 160 | Acts of 1986 | Regulating the transportation of certain reptiles and amphibians for commercial purposes.                     |
| 175 | Acts of 1986 | Regulating the retail sale of ducklings.  |
| 262 | Acts of 1986 | Protecting wildlife under the Wetlands Protection Act.  |
| 337 | Acts of 1986 | Relative to the protection of Animals.  |
| 416 | Acts of 1986 | Prohibiting the exploitation of wild animals.   |
| 481 | Acts of 1986 | Establishing certain standards for the issuance of firearm licenses.  |
| 541 | Acts of 1986 | Requiring equal access to Commonwealth tidelands.   |
| 565 | Acts of 1986 | Transferring the Wetlands Restriction Program from the D.E.M. to D.E.Q.E.                                     |
| 570 | Acts of 1986 | Relative to contributions to the Nongame Wildlife Fund on State income tax returns.                           |

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Inland Fish and Game Fund Accounts

| <u>Account No.</u> |                       | <u>Appropriations</u> | <u>Expenditures<br/>&amp; Liabilities</u> | <u>Total<br/>Reversions</u> |
|--------------------|-----------------------|-----------------------|---|-----------------------------|
| 2310-0200          | Administration        | 804,390.00            | 785,733.00                                | 18,657.00                   |
| 2310-0315          | Purchase of Equipment | 277,785.00            | 263,771.55                                | 14,013.45                   |
| 2310-0400          | Wildlife Management   | 3,339,580.00          | 3,105,929.50                              | 233,650.40                  |
|                    |                       | <u>4,421,755.00</u>   | <u>4,155,434.15</u>                       | <u>266,320.85</u>           |

|            |                           | <u>Continuing<br/>Appropriations</u> | <u>Expenditures</u> | <u>Balance<br/>Forward</u> |
|------------|---------------------------|--------------------------------------|---------------------|----------------------------|
| 2310-0300  | Dev. & Imp. of Facilities | 131,026.95                           | 73,741.14           | 57,285.81                  |
| 2310-0310* | Acq. of Upland Areas      | 286,883.39                           | 89,330.68           | 197,552.71                 |
|            |                           | <u>417,910.34</u>                    | <u>163,071.82</u>   | <u>254,838.52</u>          |

|           |                       | <u>Capital Outlay<br/>Appropriation</u> | <u>Expenditures</u> | <u>Balance<br/>Forward</u> |
|-----------|-----------------------|---|---------------------|----------------------------|
| 2670-9016 | Coastal & Inland Acq. | 3,940.99                                | -                   | 3,940.99                   |

General Fund Accounts

|           |                          | <u>Appropriations</u> | <u>Expenditures<br/>&amp; Liabilities</u> | <u>Total<br/>Reversions</u> |
|-----------|--------------------------|-----------------------|---|-----------------------------|
| 2310-0500 | Nat. Heritage, Greenways | 181,041.00            | 180,371.20                                | 669.80                      |
| 2310-0550 | Acid Rain Program        | 332,016.00            | 330,345.54                                | 1,670.46                    |
|           |                          | <u>513,057.00</u>     | <u>510,716.74</u>                         | <u>2,340.26</u>             |

|            |                      | <u>Continuing<br/>Appropriations</u> | <u>Expenditures</u> | <u>Balance<br/>Forward</u> |
|------------|----------------------|--------------------------------------|---------------------|----------------------------|
| 2310-0310* | Acq. of Upland Areas | 95,627.79                            | 29,776.89           | 65,850.90                  |
| 2310-0551  | Acid Rain Research   | 79,000.00                            | 19,941.00           | 59,059.00                  |
|            |                      | <u>174,627.79</u>                    | <u>49,717.89</u>    | <u>124,909.90</u>          |

|           |                             | <u>Capital Outlay<br/>Appropriations</u> | <u>Expenditures</u> | <u>Balance<br/>Forward</u> |
|-----------|-----------------------------|--|---------------------|----------------------------|
| 2310-8821 | Wastewater Treatm. Facility | 236,722.22                               | 56,900.25           | 179,821.97                 |
| 2310-8840 | Acq. of Cold Water Streams  | 3,760,000.00                             | -                   | 3,760,000.00               |
| 2310-8841 | Associated Costs            | 240,000.00                               | -                   | 240,000.00                 |
| 2310-8842 | Acq. of Adjacent Lands      | 7,050,000.00                             | -                   | 7,050,000.00               |
| 2310-8843 | Associated Costs            | 450,000.00                               | 3,781.75            | 446,218.25                 |
|           |                             | <u>11,736,722.22</u>                     | <u>60,682.00</u>    | <u>11,676,040.22</u>       |

|           |                          | <u>Restricted Revenue Account<br/>Total Available</u> | <u>Expenditures</u> | <u>Balance<br/>Forward</u> |
|-----------|--------------------------|---|---------------------|----------------------------|
| 2310-0312 | "Mass Wildlife" Magazine | 25,881.09   | -                   | 25,881.09                  |

Nongame Wildlife Fund Account

|           |                 | <u>Appropriation</u> | <u>Expenditures<br/>&amp; Liabilities</u> | <u>Total<br/>Reversions</u> |
|-----------|-----------------|----------------------|---|-----------------------------|
| 2315-0100 | Nongame Program | 297,436.00           | 241,642.65                                | 55,793.35                   |

|           |                  | <u>Trust Fund Account<br/>Total Available</u> | <u>Expenditures</u> | <u>Balance<br/>Forward</u> |
|-----------|------------------|---|---------------------|----------------------------|
| 2310-6005 | Bald Eagle Trust | 19,445.99                                     | 13,185.18           | 6,260.81                   |

\*75% Inland Fish and Game Fund; 25% General Fund.



# How the Sportsman's Dollar is Spent

| <u>Administration</u>   | <u>Account No.</u> | <u>Expenditures</u> |                | <u>Percentage</u> |
|---|--------------------|---------------------|----------------|-------------------|
| Administration  | 2310-0200          | \$ 524,551.58       |                |                   |
| Information-Education   | 2310-0200          | 261,181.42          | \$ 785,733.00  | 13.3%             |
| <u>Wildlife Programs</u>  |                    |                     |                |                   |
| Game Farms  | 2310-0400          | 385,959.56          |                |                   |
| Wildlife Management**   | 2310-0400          | 880,155.53          |                |                   |
| Wildlife Cooperative Unit   | 2310-0400          | 72,000.00           | 1,338,115.09   | 22.7%             |
| <u>Fisheries Programs</u>   |                    |                     |                |                   |
| Fish Hatcheries   | 2310-0400          | 944,687.91          |                |                   |
| Fisheries Management**  | 2310-0400          | 751,126.60          |                |                   |
| Fisheries Cooperative Unit  | 2310-0400          | 72,000.00           | 1,767,814.51   | 30.1%             |
| <u>Construction</u>   |                    |                     |                |                   |
| Development & Improvement of<br>Facilities for Public Use*          | 2310-0300          |                     | 73,741.14      | 1.2%              |
| <u>Land Acquisition</u>   |                    |                     |                |                   |
| Acq. of Upland Areas & Inhold-<br>ing on Existing Areas* **         | 2310-0310          |                     | 89,330.68      | 1.5%              |
| <u>Equipment</u>  |                    |                     |                |                   |
| Purchase of Equipment   | 2310-0315          |                     | 263,771.55     | 4.4%              |
| <u>Dept. of Fisheries, Wildlife<br/>&amp; Recreational Vehicles</u> |                    |                     |                |                   |
| Natural Resource Officers'  |                    |                     |                |                   |
| Salaries and Expenses(7.5%)   | 2350-0100          |                     | 633,890.22     | 10.8%             |
| Hunter Safety Training***   | 2350-0101          |                     | 197,928.32     | 3.3%              |
| <u>Transfers from Fund</u>  |                    |                     |                |                   |
| Group Insurance   | 1590-1007          |                     | 197,686.00     | 3.3%              |
| Salary Adjustments  | 2310-7001          |                     | 3,618.00       | .06%              |
| <u>Retirement Assessment (.2%)</u>                                  | 0612-1000          |                     | 323,585.41     | 5.5%              |
| <u>Interest on Bonded Debt</u>                                      | 0699-2800          |                     | 22,145.50      | .38%              |
| <u>Maturing Serial Bonds &amp; Notes</u>                            | 0699-2900          |                     | 174,000.00     | 2.9%              |
| TOTAL EXPENDITURES  |                    |                     | \$5,871,359.42 | 100.00%           |

\* Continuing Appropriation

\*\* Portions of expenditures up to 75% reimbursable by Federal Government

\*\*\* 100% reimbursable by Federal Government

SUMMARYSURPLUS, REVENUE, CREDITS, REVERSIONSINLAND FISH AND GAME FUND

July 1, 1985 to June 30, 1986

| <u>Collected by Agency:</u>             | <u>Receipt Acct. No.</u> | <u>Amount</u>                    |
|---|--------------------------|----------------------------------|
| Fishing, Hunting and Trapping Licenses* | 3304-61-01-40            | \$3,868,400.46***                |
| Archery Stamps*                         | 3304-61-01-40            | 112,969.40                       |
| Trap Registrations*                     | 3304-61-01-40            | 1,349.00                         |
| Waterfowl Stamps*                       | 3304-40-01-40            | 6,960.65                         |
| Waterfowl Stamps-Ducks Unlimited*       | 3304-40-02-40            | 22,483.60                        |
| Special Licenses Tags & Posters**       |                          | 24,322.75***                     |
| Antlerless Deer Permits                 | 3304-61-14-40            | 41,010.00                        |
| Bear Permits                            | 3304-61-14-40            | 4,600.00                         |
| Turkey Permits                          | 3304-61-14-40            | 30,805.00                        |
| Rents                                   | 3304-63-01-40            | 21,790.50                        |
| Sales, Other                            | 3304-64-99-40            | 11,541.95                        |
| Refunds Prior Year                      | 3304-69-01-40            | 3,116.99                         |
| Miscellaneous Income                    | 3304-69-99-40            | 16,558.54                        |
|   |                          | <u>\$4,165,908.84</u>            |
| <u>Collected by State Treasurer:</u>    |                          |                                  |
| Fines and Penalties                     | 3308-41-01-40            | \$ 55,286.99                     |
| Interest and Discount on Revenue        | 3395-60-01-40            | 56,000.45                        |
|   |                          | <u>\$111,287.44</u>              |
| <u>Federal Aid Reimbursement:</u>       |                          |                                  |
| Pittman-Robertson                       | 3304-67-01-40            | \$ 621,200.03                    |
| Dingell-Johnson                         | 3304-67-02-40            | 192,978.42                       |
| Anadromous Fish Projects                | 3304-67-04-40            | 3,817.17                         |
| Endangered Species                      | 3304-67-11-40            | 5,545.79                         |
| Indirect Cost Reimbursement             | 3304-67-67-40            | 242,878.62                       |
|   |                          | <u>\$1,066,420.03</u>            |
| <u>Taxes:</u>                           |                          |                                  |
| Gasoline Tax Apportionment              | 3312-05-01-40            | \$392,269.78                     |
| <br>TOTAL REVENUE                       |                          | <br><u><u>\$5,735,886.09</u></u> |
| <u>Transfers from General Fund:</u>     |                          |                                  |
| Salary Adjustments                      | 3360-95-02-36            | \$ 3,618.00                      |
| Reimbursements on Half Price Licenses   | 3360-95-08-40            | 74,028.25                        |
|   |                          | <u>\$77,646.25</u>               |
| <u>Reversions:</u>                      |                          |                                  |
| Accounts Payable                        |                          | \$266,608.03                     |
| <br>TOTAL CREDITS                       |                          | <br><u><u>\$344,254.28</u></u>   |

SURPLUS AS OF JUNE 30, 1986

\$1,317,393.00

\* See Detail Sheet #1

\*\* See Detail Sheet #2

\*\*\* As noted on Detail Sheets #1 and #2 \$7,757.75 was inadvertently credited to receipt account 3304-61-10-40(Commercial Shooting Preserves); should have been credited to receipt account 3304-61-01-40(Licenses). Also, \$2.50 credited to receipt account 3304-61-01-40(Licenses) should have been credited to receipt account 3304-64-01-40(Tags and Posters).

DIVISION OF FISHERIES AND WILDLIFE  
 RECEIPTS FROM FISHING, HUNTING AND TRAPPING LICENSES  
 Fiscal Year July 1, 1985 to June 30, 1986

| Class &<br>Type of License                    | Unit<br>Price | Quantity | Gross Amount | Fees Retained<br>by City/Town<br>Clerks | Net Returned<br>to<br>Commonwealth |
|---|---------------|----------|--------------|---|------------------------------------|
| 01 Res. Cit. Fishing                          | 12.50         | 147,409  | 1,842,583.75 | 44,167.50                               | 1,798,416.25                       |
| 02 Res. Cit. Hunting                          | 12.50         | 44,573   | 557,155.00   | 15,708.00                               | 541,447.00                         |
| 03 Res. Cit. Sporting                         | 19.50         | 58,768   | 1,145,973.00 | 19,512.00                               | 1,126,461.00                       |
| 04 Res. Cit. Minor Fishing                    | 6.50          | 8,246    | 53,599.00    | 2,784.50                                | 50,814.50                          |
| 05 Res. Alien Fishing                         | 14.50         | 1,429    | 20,720.50    | 493.00                                  | 20,227.50                          |
| 06 Non-Res. Cit./Alien Fishing                | 17.50         | 6,640    | 116,187.50   | 2,001.00                                | 114,186.50                         |
| 07 Non-Res. Cit./Alien Fishing (7 da.)        | 11.50         | 2,669    | 30,693.50    | 737.50                                  | 29,956.00                          |
| 08 Non-Res. Cit./Alien Hunting (Small Game)   | 23.50         | 1,188    | 27,918.00    | 448.50                                  | 27,469.50                          |
| 09 Non-Res. Cit./Alien C.S.P. (3 da.)         | 19.50         | 12       | 234.00       | 3.00                                    | 231.00                             |
| 10 Res. Cit. Minor Trapping                   | 8.50          | 84       | 714.00       | 34.00                                   | 680.00                             |
| 11 Res. Cit. Trapping                         | 20.50         | 709      | 14,534.50    | 291.00                                  | 14,243.50                          |
| 12 Duplicates                                 | 2.00          | 3,506    | 7,012.00     | -                                       | 7,012.00                           |
| 13 Res. Alien Hunting                         | 19.50         | 1,151    | 22,444.50    | 457.50                                  | 21,987.00                          |
| 14 Non-Res. Cit./Alien Hunting (Big Game)     | 48.50         | 1,338    | 64,893.00    | 527.00                                  | 64,366.00                          |
| 15 Res. Cit. Sporting (Over 70)               | FREE          | 20,023   |              |   |                                    |
| 16 Res. Cit. Fishing (Blind-Para.-Ment. Ret.) | FREE          | 1,415    |              |   |                                    |
| 17 Res. Cit. Hunting (Paraplegic)             | FREE          | 139      |              |   |                                    |
| 18 Res. Cit. Fishing (Age 65-69)              | 6.25          | 6,157    | 38,480.75    | 2,656.50                                | 35,824.25                          |
| 19 Res. Cit. Hunting (Age 65-69)              | 6.25          | 656      | 4,100.00     | 298.50                                  | 3,801.50                           |
| 20 Res. Cit. Sporting (Age 65-69)             | 9.75          | 2,771    | 27,017.25    | 1,203.50                                | 25,813.75                          |
| 21 Res. Cit. Trapping (Age 65-69)             | 10.25         | 43       | 440.75       | 18.50                                   | 422.25                             |
| 24 Non-Res. Trapping                          | 300.00        | 1        | 300.00       | -                                       | 300.00                             |
| Less Refunds/Bad Checks                       |               | 308,927  | 3,975,001.00 | 91,341.50                               | 3,883,659.50                       |
|   |               |          | (7,503.79)   |   | ( 7,503.79)                        |
| *Less Adjustments                             |               | 308,927  | 3,967,497.21 | 91,341.50                               | 3,876,155.71                       |
|   |               |          | (7,755.25)   |   | (7,755.25)                         |
| 22 Archery/Primitive Firearms Stamps          | 5.10          | 308,927  | 3,959,741.96 | 91,341.50                               | 3,868,400.46                       |
| Trap Registrations                            |               | 22,481   | 114,653.10   | 1,683.70                                | 112,969.40                         |
|   |               |          | 1,349.00     | -                                       | 1,349.00                           |
| 23 Waterfowl Stamps                           |               | 331,408  | 4,075,744.06 | 93,025.20                               | 3,982,718.86                       |
|   |               | 23,158   | 28,947.50    | 4,585.50                                | 24,362.00                          |
|   |               | 354,566  | 4,104,691.56 | 97,610.70                               | 4,007,080.86                       |

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SPECIAL LICENSES, TAGS AND POSTERSJuly 1, 1985 to June 30, 1986

| <u>Receipt Account</u> | <u>Type of License</u>              | <u>Quantity &amp;<br/>Unit Price</u> | <u>Amount</u> | <u>Receipt<br/>Account<br/>Total</u> |
|------------------------|-------------------------------------|--------------------------------------|---------------|--------------------------------------|
| 3304-61-02-40          | Fur Buyers                          |                                      |               |                                      |
|                        | Resident Citizens:                  | 20 @ 25.00                           | 500.00        |                                      |
|                        | Non-Residents or Aliens:            | 4 @ 75.00                            | 300.00        | \$ 800.00                            |
| 3304-61-03-40          | Taxidermists                        | 91 @ 20.00                           |               | 1,820.00                             |
| 3304-61-04-40          | Propagators                         |                                      |               |                                      |
|                        | Special Purpose Permits:            | 229 @ 1.00                           | 229.00        |                                      |
|                        | Class 1 (Fish)                      |                                      |               |                                      |
|                        | Initials:                           | 11 @ 15.00                           | 165.00        |                                      |
|                        | Renewals:                           | 151 @ 10.00                          | 1,510.00      |                                      |
|                        | Class 3 (Fish)                      |                                      |               |                                      |
|                        | Initials:                           | 13 @ 15.00                           | 195.00        |                                      |
|                        | Renewals:                           | 81 @ 10.00                           | 810.00        |                                      |
|                        | Class 4 (Birds, Reptiles, Mammals)  |                                      |               |                                      |
|                        | Initials:                           | 54 @ 15.00                           | 810.00        |                                      |
|                        | Renewals:                           | 405 @ 10.00                          | 4,050.00      |                                      |
|                        | Class 6 (Dealers)                   |                                      |               |                                      |
|                        | Initials:                           | 16 @ 15.00                           | 240.00        |                                      |
|                        | Renewals:                           | 59 @ 10.00                           | 590.00        |                                      |
|                        | Additional Stores:                  | 160 @ 5.00                           | 800.00        |                                      |
|                        | Class 7 (Individual Bird or Mammal) |                                      |               |                                      |
|                        | Initials:                           | 2 @ 5.00                             | 10.00         |                                      |
|                        | Renewals:                           | 26 @ 2.00                            | 52.00         |                                      |
|                        | Importation Permits                 |                                      |               |                                      |
|                        | Fish:                               | 8 @ 7.50                             | 60.00         |                                      |
|                        | Birds:                              | 97 @ 7.50                            | 727.50        |                                      |
|                        | Class 9 (Falconry)                  |                                      |               |                                      |
|                        | Masters:                            | 8 @ 25.00                            | 200.00        |                                      |
|                        | Apprentices:                        | 9 @ 25.00                            | 225.00        |                                      |
|                        | General:                            | 15 @ 25.00                           | 375.00        |                                      |
|                        | Class 10 (Falconry)                 |                                      |               |                                      |
|                        | Raptor Breeding:                    | 5 @ 10.00                            | 50.00         |                                      |
|                        | Class 11 (Falconry)                 |                                      |               |                                      |
|                        | Raptor Salvage:                     | 33 @ 1.00                            | 33.00         | 11,131.50                            |
| 3304-61-05-40          | Take Shiners                        | 88 @ 10.00                           |               | 880.00                               |
| 3304-61-06-40          | Field Trial Licenses                | 32 @ 15.00                           |               | 480.00                               |
| 3304-61-07-40          | Taking of Eels                      | 3 @ 25.00                            | 75.00         |                                      |
|                        | Taking of Carp and Sudkers          | 1 @ 10.00                            | 10.00         | 85.00                                |
| 3304-61-08-40          | Quail for Training Dogs             |                                      |               |                                      |
|                        | Initials:                           | 10 @ 7.50                            | 75.00         |                                      |
|                        | Renewals:                           | 25 @ 5.00                            | 125.00        | 200.00                               |
| 3304-61-10-40          | Comm. Shooting Preserves            | 7 @ 50.00                            | 350.00        |                                      |
|                        |                                     |                                      | *7,757.75     | 8,107.75                             |
| 3304-61-12-40          | Mounting Permits                    | 3 @ 2.00                             |               | 6.00                                 |
| 3304-61-13-40          | Special Field Trial Permits         | 10 @ 15.00                           |               | 150.00                               |
| 3304-64-01-40          | Tags and Posters:                   |                                      |               |                                      |
|                        | Game Tags and Posters:              | 5,825 @ .10                          | *582.50       |                                      |
|                        | Fish Tags:                          | 1,600 @ .05                          | 80.00         | 662.50                               |
|                        |                                     |                                      |               | \$24,322.75                          |

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Appointing authority (to: that is  
line of authority  
line of communication)

